

MISC - 17

#381
6-23-81
jm

11 O.
Chas. Eastman

MODEL FORM OF SPECIFICATIONS

FOR A COMPLETE

ELECTRIC LIGHT PLANT.

PRESENTED BY

THE CONTINENTAL FIRE INSURANCE CO.

OF NEW YORK.

OCTOBER, 1893.



Specifications for an Incandescent Electric Light Plant

FOR THE

Continental Insurance Co., 46 Cedar Street, New York.

GENERAL.

This plant is to consist of the furnishing and erecting of two (2) engines, two (2) dynamos; switchboard, with all necessary instruments for same; the furnishing and delivering of lamps and sockets, and the complete wiring of the building, all in accordance with the following detailed specifications.

The purchaser is to build foundations, under supervision of electrical contractor, who guarantees against vibrations, &c., make all pipe connections, and furnish and erect fixtures.

PLANT.

ENGINES. Contractor is to furnish and place on foundations two (2) horizontal, automatic, high-speed engines, arranged for direct connection with dynamos. Engine rating is to be based on 80 pounds initial steam pressure, one-quarter cut-off and 5 pounds back pressure. Each engine is to be fitted with solid steel shaft, made in one piece; one end of shaft to carry heavy balanced fly-wheel containing governor, to be of ample weight to properly balance engine; the other end of shaft to carry armature of dynamo, or to be arranged for direct connection to dynamo.

With each engine there will be furnished automatic cylinder relief valves for each end of cylinder, one throttle valve and usual parts.

Engines to be of the following sizes :

- 1 to develop 80 indicated horse-power, at 275 revolutions per minute.
- 1 to develop 40 indicated horse-power, at 300 revolutions per minute.

Engines to be equal to one of the following makes : Ames Iron Works, Westinghouse, Straight Line, McIntosh & Seymour, or Ball. (Detailed specifications of engine makers to be submitted with bid, and final choice to be made by owner.)

The variation in the speed from "no load" to "full load" to be not more than 2%.

Foundations for engines are to be furnished by and at the expense of the purchaser, under supervision of contractor, who guarantees against vibrations, etc.

DYNAMOS. Two (2) dynamos are to be furnished and put in place and arranged to couple direct to the engine shaft.

1 to be of 50 K. W. capacity, at 275 revolutions.

1 to be of 25 K. W. capacity, at 300 revolutions.

Each dynamo to be capable of generating current to its rated capacity at a voltage sufficient to give 110 volts at the lamps, with a maximum loss of potential in the wires of not more than 5 per cent. at full load, as called for in these specifications. Each dynamo to be capable of developing this voltage after a run of ten hours at full load.

Dynamos are to be carefully balanced, commutator sections to be of hard copper. There will be no undue heating of either of the dynamos after a continuous run under full load for ten hours, and there will be no undue sparking at the brushes under full or light loads.

Dynamos to be compound-wound, practically automatic in action, and there will be but slight, if any, changes in potential with large changes in load.

Dynamos to be capable of working in multiple or parallel, and when so working, each dynamo must take its proper proportion of the load automatically.

Foundations for dynamos are to be furnished by and at the expense of the purchaser, but are to be put in under supervision of the contractor and guaranteed by him against vibrations, etc.

SOCKETS. Contractor is to furnish and deliver to building or to fixture contractor twelve hundred (1200) polished brass key sockets.

LAMPS. Contractor is to deliver to building fifteen hundred (1500) 16 C. P. incandescent lamps.

SWITCHBOARD.

Contractor is to furnish and erect in cellar where directed, a polished white Italian marble switchboard, of ample size to contain all the appliances and switches. Marble to be 1½ inches thick. Board is to be set out from walls to allow all

connections to be made on the back. Sides to be enclosed with neat oak partition, with door and moulding around top.

The contractor is to furnish and place on switchboard the following materials:

- 2 Rheostats.
- 2 Weston Illuminated Dial Ampere meters—1 of 500 amperes capacity; 1 of 250 amperes capacity.
- 1 Weston Illuminated Dial Voltmeter.
- 1 Voltmeter Switch for connecting voltmeter with either generator or feeder, or either side of street service.
- 14 Magnetic Automatic Cut-outs—1 magnetic automatic cut-out of proper capacity is to be provided for each of the lighting and motor circuits, one for each of the two dynamo feeders, and one for each of the two outside wires of the street system, making 13 in all, and one for extra circuit.
- 2 Double-Pole Dynamo Switches.
- 10 Three-Wire Circuit Switches for building.
- 1 General Three-Pole Double-Throw Switch by which the whole system can be thrown on the street mains, on the dynamo, or completely off.
- 1 Pilot Lamp for each generator, with other lamps for the proper lighting of the board.

The board is to be complete with bus bars and cut-outs and connected and arranged so that either of the dynamos or the street service can be connected to the lamps.

WIRING.

The wiring is to be carried from the entrance of the building and from dynamos to switchboard, and from switchboard to eleven hundred and thirty-nine (1139) outlets for eleven hundred and eighty-eight (1188) 16 C. P. lights, located as shown in detailed list attached.

STREET SERVICE. One three-wire feeder is to be run from point marked "A" on plans to the switchboard, for connecting to street service, each wire to be of 300,000 C. M. section.

DYNAMO FEEDERS. One pair of feeders of 400,000 C. M. section each is to be run from the 50 K. W. generator to the switchboard, and one pair of feeders of 200,000 C. M. section each from the 25 K. W. generator to the switchboard.

LIGHTING CIRCUITS. From the switchboard, eight (8) main circuits are to be run as follows :

- 1 for cellar and 1st floor.
- 1 for 2nd and 3rd floors.
- 1 for 4th and 5th floors.
- 1 for 6th and 7th floors.
- 1 for 8th and 9th floors.
- 1 for 10th and 11th floors.
- 1 for 12th floor and gallery.
- 1 for superstructure.

MOTOR CIRCUIT. In addition to the above lighting circuits, a special motor circuit is to be run for motor in rear court, basement hall, and for motor on 3rd story.

SYSTEM OF WIRING. All mains are to be of three wires. The middle wire to be equal in carrying capacity to the sum of the two outside wires, and all so arranged and connected that current from either the two or three wire system, or from a plant located in the building, may be used, as desired.

KIND OF WIRE. All conductors are to be of Grimshaw, Habirshaw or Bishop rubber covered white core wire, the copper of the conductors to be of at least 97 per cent. conductivity. No wire smaller than No. 14 B. & S. gauge is to be used, and all wires larger than No. 10 B. & S. are to be stranded.

JOINTS. There are to be no joints made in the wire.

LOSS OF POTENTIAL. All wires are to be of such sizes that with all the lights called for herein burning there will be no undue heating, and the loss of potential between switchboard and any outlet will not be greater than 5 per cent., and the variation between any two outlets in the building will not be greater than 2 per cent. The loss of potential is based on the use of a standard lamp of 110 volts, having an efficiency of 3.8 watts per candle power, and the calculation is made on the two-wire system.

TUBING. All wires are to be run in brass-covered tubing, such as that manufactured by the Interior Conduit and Insulation Co. of New York.

There is to be but one wire in a tube.

All tubing is to be put up first and wires pulled through after the rough plaster is on. All joints are to be made with standard sleeves and corners turned with standard elbows, and tubing open only where it is desired to use the current. Where tubes are run under tiled or marble floors or in cement they are to be protected with asphalt.

CUT-OUTS. All necessary main and branch line cut-outs are to be furnished and put in place throughout the building, all of which are to be double-poled and mounted on some incombustible material. Cut-outs are to be placed in boxes lined with asbestos or vulcabeston; covers for same to be provided by purchaser.

SWITCHES. C. S. Flush Switches are to be furnished and put in place as follows:

- 4 Double-pole Switches for ceiling lights on each side of ground floor.
- 1 Double-Pole Switch for ceiling lights on 12th floor.
- 1 Double-Pole Key Flush Switch for Vestibule ceiling light.
- 1 Double-Pole Switch for ceiling light Officers' Dining Room.
- 1 Double Pole Switch for Directors' Room.

FIXTURE SUPPORTS. At all outlets where there are no gas pipes, contractor is to furnish and put in place suitable fixture supports.

FIXTURES. All fixtures are to be furnished and put up complete by purchaser, including wiring of fixtures, insulating joints, etc.

QUALITY OF WORK.

All labor and material are to be strictly first-class in every particular, and the whole plant installed in accordance with the rules and regulations of the New York Board of Fire Underwriters.

TRIAL RUN.

Contractor is to make trial run of plant for six consecutive working days, and is to instruct purchaser's engineer in the proper method of operating the plant.

GENERAL.

The whole intent of these specifications is to avoid lengthy details explanatory of requirements and standards clearly defined in headings enumerated. A complete plant of the highest standard of efficiency and workmanship is required, and must be furnished by contractor. Contractor must recognize his liability and agree to furnish everything that may be required to deliver the service provided for in these specifications, whether definitely referred to or only implied, and no extras whatever will be allowed except by written agreement.

LIST OF OUTLETS AND LIGHTS.

	Brackets.		Chandeliers.		Total.	
	Out.	Lts.	Out.	Lts.	Out.	Lts.
Cellar,	60	60			60	60
FIRST FLOOR:						
Vestibule,			1	4	1	4
Hall,	12	12			12	12
Toilet,	1	1			1	1
2 Private Toilets,	2	2			2	2
2 Rear Rooms,	46	46	4	8	50	54
2 Front Rooms,	37	37	8	16	45	53
	98	98	13	28	111	126
Mezzanine Floor,	4	4			4	4
SECOND FLOOR:						
Hall,	6	6			6	6
Toilets,	2	2			2	2
Janitor's Closet,	1	1			1	1
2 Rear Rooms,	24	24	2	4	26	28
Large Room,	38	38			38	38
	71	71	2	4	73	75
THIRD FLOOR:						
Hall,	6	6			6	6
Toilets,	3	3			3	3
2 Rear Rooms,	24	24	2	4	26	28
2 Front Rooms,	38	38			38	38
	71	71	2	4	73	75

FOURTH FLOOR :

	Brackets.		Chandeliers.		Total.	
	Out.	Lts.	Out.	Lts.	Out.	Lts.
Hall,	6	6			6	6
Toilets,	3	3			3	3
Janitor's Closet,	1	1			1	1
2 Rear Rooms,	22	22	2	4	24	26
Large Room,	37	37			37	37
	69	69	2	4	71	73

Fifth Floor, same as 4th, 69 69 2 4 71 73

SIXTH FLOOR :

Hall,	6	6			6	6
Toilets,	3	3			3	3
Janitor's Closet,	1	1			1	1
2 Rear Rooms,	25	25	2	4	27	29
Large Rooms,	41	41			41	41
	76	76	2	4	78	80

7th, 8th, 9th, 10th and
11th floors, same as
6th, each 76 76 2 4 78 80

TWELFTH FLOOR :

Hall,	6	6			6	6
Toilets,	4	4			4	4
4 Rear Rooms,	26	26	2	4	28	30
Large Room,	55	55	4	8	59	63
	91	91	6	12	97	103

TWELFTH FLOOR GALLERY :

Hall,	2	2			2	2
Toilets,	3	3			3	3
2 Rear Rooms,	23	23			23	23
Gallery,	19	19			19	19
	47	47			47	47

Brackets.		Chandeliers.		Total.	
Out.	Lts.	Out.	Lts.	Out.	Lts.

SUPERSTRUCTURE :

Hall,	7	7			7	7
Bathrooms,	2	2			2	2
4 Bedrooms,	11	11			11	11
Passage	2	2			2	2
Kitchen and Pantry,	7	7			7	7
Laundry,	5	5			5	5
Dining Room & Pantry,	10	10	2	4	12	14
Storage,	1	1			1	1
Directors' Room,	13	13	1	4	14	17
	58	58	3	8	61	66

3 Elevator Circuits complete to outlet in car,					3	6
--	--	--	--	--	---	---

SUMMARY.

Elevators,			3	6	3	6
Cellar,	60	60			60	60
1st Floor,	98	98	13	28	111	126
Mezzanine Floor,	4	4			4	4
2nd Floor,	71	71	2	4	73	75
3rd "	71	71	2	4	73	75
4th "	69	69	2	4	71	73
5th "	69	69	2	4	71	73
6th "	76	76	2	4	78	80
7th "	76	76	2	4	78	80
8th "	76	76	2	4	78	80
9th "	76	76	2	4	78	80
10th "	76	76	2	4	78	80
11th "	76	76	2	4	78	80
12th "	91	91	6	12	97	103
12th " Gallery,	47	47			47	47
Superstructure,	58	58	3	8	61	66
Total,	1094	1094	45	94	1139	1188



